Planarization Technical Term Dictionary

Edited by
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and
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Preface

Over the past decade, planarization has proven to be an enabling technology and thus has become mainstream in integrated circuit (IC) manufacturing. Although planarization has its basis in mechanical wafer polishing techniques, it is a polishing process involving chemical phenomena. Since planarization applies to ICs, knowing the basics of IC production is a critical element in understanding the main functions and features of planarization. Understanding the planarization process further requires detailed knowledge regarding the materials, processing equipment, metrology tools and integration schemes involved in implementing this technology. As such, this term dictionary is designed to provide comprehensive explanations relating to devices. It also strives to provide details regarding various unit operations within the IC manufacturing flow. Additionally, post-planarization cleaning terms and definitions are emphasized in this document in order to give the reader a more comprehensive understanding of the entire planarization module.

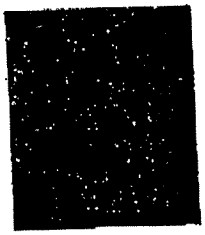
This is the first edition of the English Dictionary of Planarization Terms published for the general public and will undoubtedly be a very valuable reference book for those working in the planarization and related areas. This publication is the result of fruitful collaboration between the Planarization CMP Technical Committee of the Japan Society for Precision Engineering and the NSF/SRC Engineering Research Center for Environmentally Benign

(from oils or other organic materials) is easily removed since ice particles cause the organic material to harden and break off. Because of this, ice particles function as oil contamination removal agents. The friction created between the ice and the cleaning objects causes electrostatic charge to build up which can promote contaminant re-adhesion. In order to prevent this from occurring, ions are used to neutralize the charged surface of the wafer. Ice scrubbing is environmentally preferred since it does not involve the use and subsequent disposal of chemicals.

IC pad, IC 1000 pad

De facto standard name of the urethane pad used for CMP process. IC 1000 is a Trademark of Rodel Inc. IC pad was invented by Rodel Inc., currently Rohm and Haas Electronic Materials CMP Technologies, for inter-layer dielectrics (ILD) CMP under the basis of urethane technology for polishing. The pad is composed of urethane matrix and uniformly distributed micro pores as shown in the cross sectional structure. The pores are spherical in nature and range in diameters from 30-50 μm. The fraction of the pore is about 35% of the pad total volume, but can be changed by manufacturing conditions. The higher the

porosity, the lower the pad density. The pore radial size and distribution is also controlled in order to obtain a specific pad hardness, elastic modulus and compressibility. Hardness is measured by using the Shore D hardness test. Typical density of the IC1000 pad is in the range between 0.63 to 0.85 g/cm^3 and the corresponding hardness ranges from 52 to 62. The compressibility ranges from 0.5 to 6.0 %. IC 1000 pad can be used either as solo pad or stacked pad. The stacked pad helps to improve both of die size planarity and wafer size planarity at the same time. IC 1000/Suba IV or Suba 400 is a CMP pad stacked with non-woven fabric sub pad and IC 1400 is stacked with foam sub pad.



Cross-sectional view of IC 1000 pad
(magnification : ×100)

IC pad